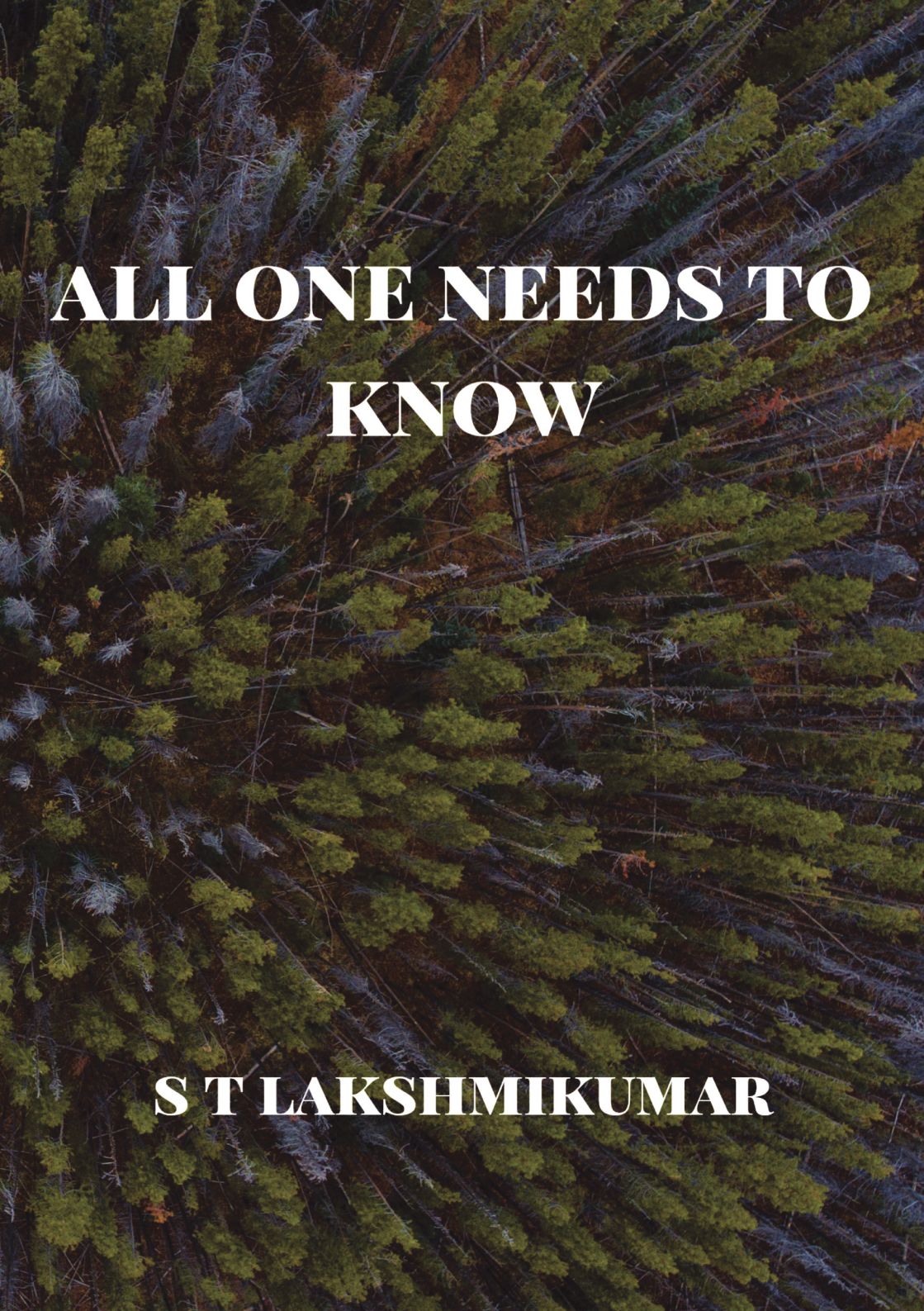


An aerial photograph of a dense forest. The trees are mostly evergreens with green needles, but many branches are bare and brown, suggesting a winter or late autumn setting. The perspective is from directly above, looking down on the canopy.

ALL ONE NEEDS TO KNOW

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This essay has been inspired by the ancient Indian text, the “pancha-tantra (five-techniques)”. An introduction to that text will be helpful in understanding the title and the content. The story of panchatantra begins with a king lamenting that his sons, the future kings, were being given up as uneducable by each and every tutor. One great scholar, Vishnu Sharma, offers to educate them in a very short time and proceeds to tell the princes five different stories. Very much like a Russian doll, there are stories inside the stories and often more stories inside those stories. A majority of the characters are animals which speak like humans familiar with the ancient texts of India.

When the text is read carefully, one realises that despite animals being the main characters, these stories are not children's literature. Animals may have helped to hold the interest of the uneducable princes, but all the five techniques described by Vishnu Sharma as stories are extremely relevant for hereditary kings. The first of these is “breaking friendships”. It is after all most important for kings to break alliances between other kings to prevent having to fight stronger armies. The second is “making friendship” and once again it is important for princes to make friends and have allies. The third story describes the fight between “the crows and the owls”. In this fight the apparently stronger party loses. This again is a very important lesson to the future kings that an apparently stronger party may not win a war. So the king should not

be complacent even when fighting a weaker enemy. The fourth story, “loss of gains” is an important warning; in the quest for more success, there is a risk of losing what has been gained earlier. The last story is “acting without reviewing”. It is the shortest piece. It is a very important reminder to continually review one's own actions. Life is too complicated for anyone to ever stop reviewing their actions.

Tradition says pancha-tantra is “niiti” sastra. Nowadays, niiti in almost all Indian languages means moral. But this was never the ancient meaning of the word. Niiti was knowledge that enabled humans to act resolutely and achieve success. So the texts on niiti starting with the extremely ancient niiti sataka or one hundred poems in sanskrit by Bhartrihari would describe how intelligent people behave and also how the fools do. They praise human effort but also say that fate decides everything. They shower respect on learned individuals and also say that any wealthy person is considered by society to be learned. There is never a moral judgement. Far from being moral, niiti in the ancient texts was amoral. And one notices that from a moral point of view, the lessons of pancha-tantra, on how to break friendships have to be condemned.

Even more important, niiti is instruction for individual success not for the collective benefit of the society. If the lessons of panchatantra were really useful in ancient times and not merely in fiction, they would not have been more useful to a good king committed to the

welfare of his subjects or less useful to one wishing to enjoy the luxuries in the palace or even to the one seeking kingship only to exercise his sadistic urges. This “amoral” nature of the advice in the pancha-tantra is obviously similar to the old adage that the knife can be used either for cutting throats or fruits. In any specific instance of cutting fruits or throats, some humans will approve while others will disapprove.

A second aspect of the pancha-tantra is also obvious. Vishnu Sharma did not offer “specific advice” to the princes about how to improve their physical strength or be better at swordplay. There are no lessons on how to build forts, maneuver armies or collect taxes to support the king's power. Each of these skills requires a different training. All these could not have been condensed in the panchatantra and they were not even mentioned. Even the stories about making and breaking friendships do not include specific do's and don'ts.

Neither the ancient advice to hereditary princes nor the method followed, illustrating important issues through stories, will be found acceptable in the contemporary technologically advanced world. Very many specialised skills are needed for success in the contemporary world. Professional success is much more important in today's commercial world than it was in the ancient times, both for accumulating wealth and enjoying personal liberty of action.

So, the present effort does not attempt to suitably recast ancient stories for the modern world. But it incorporates two attributes of pancha-tantra highlighted above. With an amoral attitude, it tries to describe what “is” not what “should be” or “ought to be”. It also has no specific advice for “professional success”. This is not a self help manual based on “ancient wisdom”, providing action points for professional development.

Hopefully, the “neeti” described here will help everyone achieve personal ambitions in the contemporary world. Both individuals seeking to help themselves and those seeking to help others would benefit from this amoral exposition. “Knowing” the world as it “is” is expected to provide a universal framework so that everyone can balance their individual goals and circumstances, plan for purposeful action and succeed.

The first step or part of this exposition is to learn “why and how” some useful or necessary knowledge is also logically infallible (that which never fails to be true). We concentrate only on “why and how”. We do not attempt to identify which specific piece of knowledge is infallible. That would need extremely specialized training. What does “infallible” mean in the present context? Let us consider a statement or a “proposition”, (that which is proposed). “This swan is white”. One would expect this to be infallible because it refers to a specific swan which is being observed while the statement is being made. It assumes that everyone knows what a “swan” is and which objects are “white”. So, unless the person

making the proposition is deliberately lying in order to mislead others, it is likely to be true. But it is of very little use.

Next consider a modified proposition. "Swans are white". How does one know if this is true? Obviously by seeing swans. The statement is true till one sees a black swan in a zoological garden. So we modify the proposition further. "Not all swans are white". This proposition is obviously infallible but again of very little use in practice. The infallibility or otherwise of the above statements is determined by observation which has its own limitations. For example, the statement that the parrot is a green bird with a red beak will not be true for a person who is colour blind. We need to identify infallible knowledge that is useful.

The Greeks developed a "logical" method which they called "reductio ad absurdum" to know if a proposition is truly infallible. The method first assumes the opposite or negation of the proposition being examined to be true. That is, assume that the specific proposition being discussed is never true. They then used logic to follow up from that assumption. If the logic leads to an absurdity, they argued, that the proposition should be accepted to be infallible. The Greeks primarily used this method for geometry. A rather detailed understanding of the basics of geometry provided here is necessary for topics to be discussed later.

Greek Geometry begins with a few assumptions also called axioms. The axioms are idealised and abstract ideas. The

first axiom defines a point. A point in geometry is not just a spot made by a sharp pencil on a piece of paper or a star in the sky. A point is something that has no measurable size in any direction. A point made on paper by a sharp pencil will have a size if it is seen under a microscope. A circular coin seen from a very long distance will look like a point but with a telescope the size will be obvious. A point in geometry is therefore an imaginary thing.

The second axiom defines a line joining two points. A line has a length but no width. Obviously, it is again another imaginary thing. Clearly one can draw any number of lines through a point and any number of lines between any two points. That leads to the next idealised concept. That of a straight line which is the line between two points which has the shortest length. Once again one does not identify the straight line by measuring the length of a number of lines. This is an impossibility since there are, as said above, an infinite number of lines. Just as a point in geometry is not the dot made by a sharp pencil on a piece of paper, a straight line is not to be considered a line drawn along a straight edge or stretched string.

If there are an infinite number of lines joining two points, the very idea that between any two points there will only be “a single” line with the shortest length rather than many, is an idealisation as is the next axiom that a straight line can be extended without any limit.

Two straight lines can intersect at a point. This intersection creates four “angles”. If the four angles formed are equal to one another, they are called “right angles”. This equality is

a logical concept and not determined by measuring with an instrument. A third straight line not passing through this point of intersection and crossing the first two lines will create a right angled triangle, a triangle with three straight lines as sides and one angle being a right angle. The side of the triangle opposite to the right angle is the hypotenuse. The square of the length of the hypotenuse is equal to the sum of the squares of the lengths of the other two sides. The Greeks called his statement the Pythagoras theorem. There are innumerable objections from many cultures that the statement was known to their ancestors before the time of Pythagoras and so the name should be changed.

But is Pythagoras' theorem or whatever we choose to call it, infallible knowledge? The answer is extremely important for our discussion of infallible knowledge. Is it possible to "prove" through the method of "reductio ad absurdum" that the Pythagoras theorem is infallible? Euclid described the logical steps in his book "Elements" but he used another axiom called the "Euclid's fifth". If "reductio ad absurdum" is not used, one can only observe a small or large number of examples to conclude that the theorem is most probably true. Thus one may "know the theorem" but can not "prove that it is infallible knowledge".

To understand Euclid's fifth, let us consider two different points. As already said, through each, an infinite number of straight lines can be drawn. It is obvious that many of these will intersect forming angles. Only one straight line passes through both points. But all straight lines can be extended without limit. So as the lines through any of the two points are extended, one can see that more and more of the lines

will intersect. Euclid's fifth says that no matter how much the lines are extended, one and only one pair will never intersect. This is obviously another idealization.

Euclid's method (*reductio ad absurdum*) will prove that the Pythagoras theorem is infallible if Euclid's fifth, that there will only be one pair parallel lines passing through two distinct points is also accepted as an axiom. Many great mathematicians dreamed of being able to derive Euclid's fifth from the other axioms. Everyone failed for nearly 2000 years before it was discovered that geometry is possible without the limit of Euclid's fifth. In one such new geometry, there are no parallel lines at all. In another, there are an infinite number of parallel lines passing through a point not on the given line. The Pythagoras theorem however is not obeyed in these novel geometries.

A few fairly obvious conclusions can be drawn from this brief summary of axiomatic geometry. First and foremost, the theorems or propositions being proved infallible are not obvious consequences of the axioms. There is no obvious reason to "guess" that the Pythagoras theorem would be true just by assuming Euclid's fifth. Pythagoras theorem is only one among an extremely large number of theorems in geometry. Each can be proved using many paths of logic. Theorems will not be proved true according to one line of reasoning and false according to another. Every theorem in geometry can be proved using logic, starting from any of the other theorems. There is never any inconsistency. This is the second important conclusion.

Finally, and most surprisingly the axioms may contradict our common sense. Consider the alternative geometries mentioned above. The space which has no parallel lines is to some extent visualizable. It is a sphere. All straight lines, shortest distances between two points on the sphere are great circles, circles drawn on the sphere which share their centre with the centre of the sphere. But the space where at every point there are multiple parallel lines is impossible to visualise. It is often compared to a saddle point where the curvature in one direction is opposite to the curvature in the perpendicular direction. At one point, the visualisation seems to be reasonable. But a space where every point is a saddle point is impossible to visualise. It does not agree with common sense.

Euclid obviously came up with his axioms of geometry by idealising a point, a line, a straight line etc. Over the last three hundred years, mathematicians have slowly come to realise that this need not be the case. “Reductio ad absurdum” can be employed with any set of axioms. The choice of axioms has to ensure that collectively they are consistent and do not lead to contradictions. Further the choice needs to be interesting, that is to say the choice of axioms should lead to plenty of non obvious theorems and prepositions. In such a system, one cannot selectively dismiss or refuse to accept a specific theorem since all theorems are linked together. All modern mathematics falls into this scheme. Knowing that a scheme of axiomatic mathematics exists and no theorem proved therein can be individually rejected is an extremely important part of “all one needs to know”.

Why this is so will become clear shortly. However, a lot of mathematics is not needed either for this analysis or for real life. The little mathematics that any individual needs, like counting, is very simple. And today, with electronic gadgets being readily available, extremely complex mathematics can be easily used without learning mathematics.

Geometry will confirm that the sides of two different triangles are of the same length if the lengths of two of the sides as well as the angle between them are equal in both triangles. But for practically confirming that two lines are of the same length, one requires observation, measurement or both. Observations and measurements are both uncertain. To go back to the earlier proposition of swans, there are many shades of white. So what is the shade of a white swan? In a painting software, white is represented by a number. A measurement is nothing but an observation which gives a numerical result. A measurement is accurate only upto a limit determined by the methods and instruments used. This is the first lesson in science. It is most easily seen in a digital minute clock. The reading of such a clock changes after one minute. Such a clock cannot be used to measure a smaller time interval. And that is true of all instruments and all measurements. There will always be a minimum value that can be measured. For the present discussion, it is enough to recognise that numbers in mathematics are exact but the numbers obtained by measurement have an error or uncertainty associated with them.

Measurements appear to be superior and more useful than qualitative observations. Firstly, even with errors numbers are felt to be more precise than words. It is difficult to get exactly the same shade of white by just looking at the colour but white defined by a number is identical irrespective of the software used. Another extra number may be used to represent possible errors in the measurement. The error includes the minimum value an instrument can measure, changes in the surroundings, the skill of humans making the measurement etc. This extra number is the maximum difference between a pair of measurements made with the same instrument and under identical conditions. But the result of the next measurement cannot be predicted more precisely than the error. So every measurement is really a distribution and there will be a probability, big or small that the next measurement will give a result corresponding to each possible value in the distribution. Two measurements in this distribution will differ from each other by an amount determined by the error.

Mathematical operations can be made on the numbers obtained by measurement. For example, it is possible to add, subtract or take an average of numbers obtained by measurement. Advanced mathematics like integral and differential calculus can be used on the numbers. Mathematics can be used to relate one measurement with another. The error in the result obtained after these steps of mathematics will also have to be calculated from the error in the individual measurements. This leaves everyone at the mercy of “experts in individual

disciplines”, those who have “studied” the procedures of observation, the measurement, the mathematics used for calculating the final results and the errors in those results.

Earlier, while identifying the first step or part of “all one needs to know” we side stepped the complexity of the various branches of axiomatic infallible knowledge, that is to say modern mathematics, and the necessity of expertise to understand them. We focussed instead on something that everyone can understand, the essential nature of infallible knowledge.

We do something similar here. Without being bogged down by the impossible task of understanding the large number of different measurements and uncertainties therein, we divide all observational measurements into two categories. Those where the relationship between the numbers obtained by measurement is correlational and those where it is causal.

The first step is to understand the terms correlation and causal. When two measurements or observations are correlated, the relationship between them is easy to observe. In a typical example, as one number increases so does the other. Or, as one increases the other is seen to decrease. In many cases, merely showing the data as points on graph paper gives a visual image of correlation. As a concrete example, if children do not get enough food, they are malnourished and will be less healthy.

Note that in this example, “enough food” and “more healthy” are not precisely defined. Instead of the words “more healthy“, one can use numbers like the height and weight of the children of the same age and instead of the words “enough food”, numbers like the weight of food, its calorific content and concentration of essential nutrients. Sometimes this permits quantifying the errors in those numbers. Then, complex mathematics, called statistics, can be used to establish that a correlation between the numbers representing health and food exists and to determine the “strength” of the correlation. But it takes us back to experts who will “interpret” the data while insisting that “correlation is not causation”.

One encounters this last bit very often and so it is useful to understand the quoted text. Let us consider three measurements, A, B and C. Assume that independent studies have confirmed that A is correlated with both B and C. The reasons for the correlation may appear quite sensible. But, this “understanding” of correlation cannot be used to expect or understand a correlation between B and C. One cannot also relate the strength of the correlation between A and C with the strength of the correlation between A and B.

Even when the strength of the correlation is extremely high, the probability of finding results that contradict the expected correlation can be quite significant. This can be termed the “reverse” probability. However, it is never discussed academically. The heights of adult men and

women are a good example to understand this reverse probability. Generally men are taller. Biologists call this sexual biomorphism. More precise measurements will confirm this to better accuracy or smaller error. But if one selects a man and a woman at random, there will be a probability that the woman is taller. This probability will not change when measurements are made more precise. This is the reverse probability, the probability of a result being opposed to the correlation.

Reverse probability becomes significant if distributions are broad and overlap. In the example used above, the heights of males and females vary a lot in themselves. There is also a large overlap. So the reverse probability is quite noticeable. In technical language, if the overlap of the distributions is large, more precise measurements will help to separate them and confirm more precisely that the mean value of one of the distributions is higher than the mean of the other. But the reverse probability will not change.

In contrast to correlation, a causal relationship between measurements requires axiomatic assumptions and the mathematical relationships logically deduced from the axioms must be confirmed by observations. This is a complex idea. To understand this, we shall consider the first truly causal relationship identified, gravity. The force of gravity is claimed to be the “cause” of both an apple falling from a tree and the moon moving around the earth. What does the statement mean when only the

change in the positions of the apple or the moon with time can be observed?

First and foremost, what is force in this context? Force in physics is defined as something which is necessary to move objects. And if we look closely at objects which are not observed to move, we realise that either the observer is also moving with the object or that there is another force preventing movement. A car for example is not moving with respect to the driver. It moves only with respect to the objects on the road. When the apple falls on the ground it stops moving. The force of gravity causing it to fall does not disappear. A new force, the electrostatic force of repulsion between the atoms in the earth and the atoms in the apple, prevents the apple from moving further due to the force of gravity.

Force should not be viewed merely as a word. It has to be a mathematically defined quantity. It is defined as the product of the acceleration of the object and its mass. Acceleration cannot be just a word either. It is the rate at which the velocity changes. Finally, velocity is defined as the rate at which the position changes with time in a specific direction. Through these definitions, the force is indirectly linked to measurements. To define these rates, a new branch of mathematics called calculus is needed and it was invented by Newton before he proposed the laws of motion. Based on the laws of motion, he came up with the law of gravitation.

The assumption in calculus is that the variables, things that are changing do so continuously. This in turn means that the movement does not change abruptly. In more descriptive language, if such results were displayed as a line, there would be no kinks. This idealisation in physics is similar to axioms in geometry. All this mathematical idealisation is necessary for understanding the force as a causal relationship.

Gravity isn't just the name of something that causes both the apple to fall and the moon to move in orbit. It is a mathematical relationship between the measurements of the changing positions of objects. The mathematics assumes that the force of gravity exists between every two material objects in the universe and that the force decreases exactly to one fourth the value when the distance between the objects is doubled. The force also increases to twice the value if the product of the masses of the two objects is doubled. In addition to this, one needs to assume that the entire mass of an object is concentrated at one "point". The distance between the two objects can be a unique fixed value only with this assumption. The distance between two objects is the length of the straight line, the shortest distance between the two points at which the masses are assumed to be concentrated. The law of gravity is not merely stating in words that a force exists between the sun and the earth. Such a statement is merely speculation and imagination. Mathematically defining a force is necessary in order to understand gravity.

In the case of geometry one was idealising reality. One can draw thicker and thinner lines and imagine a line without width. But with the law of gravity, the situation is really startling. Why should the mass be assumed to be concentrated at a single point? Accepting that the force of gravity acts between parts of a spherical body like the earth, one can mathematically show why the mass can be assumed to be at the centre. Calculating the forces between all the individual microscopic pieces of earth and moon and summing them all up will give the same result for the gravitational force between the earth and the moon as the simpler mathematics of assuming that their masses are concentrated at their centres. But this does not explain why nature should behave like this.

Similarly, why does calculus, a mathematical procedure developed for functions with specific properties produce experimentally verifiable results? Calculus assumes that the functions are “continuous”. Only a continuous curve can be differentiated. This technical word means that the rate of change of a continuous curve is continuous. In other words a continuous curve can be differentiated an infinite number of times and none of them can have a kink.

But why should real measurements of time and distance behave as if they are continuous? And this mystery does not stop here. Just as one can prove many new interesting theorems in geometry, one can solve the mathematics of gravity for new situations and perform experiments to confirm that the results are true. The

mathematics for example would show that gravity can cause the movement of an object along a straight line, an ellipse, a parabola or a hyperbola. Only these are experimentally observed.

The modern mathematician said axioms need not make sense. The modern physicists followed. While the utility of mathematics is a mystery, gravity is an “objective” force. There is a body out there and it follows a path even when no one is observing it. Quantum mechanics needs a new mathematical system where this has been given up. Using quantum theory, only the probability of a particle being detected at a given location in space can be calculated and the path along which it reached there is not merely unknown but unknowable. All experiments confirm that all forces of nature other than gravity can only be “explained” if a “quantum theory” is used. Here, “explanation” only means that calculations made from the theory agree with experiments. Physicists had to accept that reality is mathematical and that the axioms of mathematics required to “explain” experiments are absurd. They do not understand why.

Unlike pure mathematics, these causal relationships are anchored in the real world. It is easy to dismiss the absurdity of the axioms of mathematics claiming that they are “imaginary” and of no consequence. But that option is not available in physics. What If an individual observation appears to contradict fundamental physics? That is to say that the experimental result contradicts what was calculated from the theory. Can such an

“inexplicable” result be the basis to question the theory and ultimately the very idea of infallible knowledge?

As pointed out before, the mathematical framework links millions of earlier observations. Pending the creation of a new mathematical framework explaining all earlier measurements as well as the results currently claimed to be inexplicable, it is the “inexplicable” result that has to be rejected. There could be multiple reasons both for the “inexplicable” results and the prominence given to them. For example, the inexplicable results may be errors. Deliberate fraud is a possibility that should never be ignored, particularly if many people find “utility” in ignoring ²the conclusions of infallible knowledge. They will use these “inexplicable” results to justify themselves. We thus encounter the idea of “utility” which is at the core of the present essay.

Let us consider another possibility. The observations do not contradict fundamental physics (infallible knowledge) but the mathematical framework of fundamental physics is unable to quantitatively confirm the observations. A simple example will illustrate this. The measurements of the position above the ground of a metal sphere the size of a human fist, dropped from a tall tower can be directly determined from the law of gravitation. The results are well known and fresh measurements will be of interest only to students who wish to personally confirm the infallible causal relationship. There will be errors from which the experimenter can learn.

If instead of a sphere one considers a parachutist, the rate of descent and the speed with which the parachutist lands on ground cannot be directly calculated using the law of gravity. Mathematical procedures, using the laws of gravity and mechanics, and approximate values for the properties of air friction are needed to calculate the values. Despite relying on infallible theoretical physics, they provide only approximate answers. All the products and services offered by technology depend on similar "quasi fundamental physics" tools.

Products of science and technology are objective in that they give the same result for all users. But there is always some chance of failure. The chance of failure of some of the products may be fairly large. For example, the practical procedures employed by chemists do not contradict physics and their reliability is very high. The processes of life in a living organism are all chemical. Biochemistry is chemistry. But since biomolecules are very complex, the ability to accurately predict the results decreases. Finally medicines are also chemicals but the utility of mainstream medical treatment is determined by comparing the response of people who were given the medicines with people who were not. This is called the the double blind test. The response of any two humans to any medicine is never exactly the same. So one is left with conclusions that are mostly based on correlations. As mentioned above, the reverse probability should also be considered when correlations are the basis for the decisions.

All human cultures have been developing technology for millennia. Fire and stone tools are the oldest examples. Such “knowledge” is loosely called collective or cultural experience and is assumed to have been acquired by trial and error or more correctly the correlation between success and trial, making the knowledge correlational. But what if this collective “correlational wisdom” violates infallible knowledge or fundamental physics? Logically, infallible knowledge must be the guide and the claims of the so-called ancient experience must be rejected. This follows logically from the above description of infallible knowledge as not permitting the existence of mutually contradictory results or theorems.

Let us consider some examples to explore this logic further. Infallible fundamental physics says that there are four and only four fundamental forces of nature acting between any two particles of matter. Except gravity, the other three act only at extremely short distances. So, the only force a planet, Jupiter for example, can exert on a newborn baby is gravity and the force of gravity due to the attending doctor in the delivery room is much larger because Jupiter is very much more distant even if it is also much heavier. But a large fraction of humans refuse to reject astrology which predicts an influence of Jupiter on the baby.

Another example is the common belief that perpetual motion machines that can create energy out of nothing are possible. Nobody has ever been able to create a mathematical theory of physics that does not include

conservation of energy. Millions of experiments linked through the infallible mathematical theory rule out the possibility of energy being created or destroyed. People however continue to reject this law of nature and believe in creating free energy.

Another example is the impossibility of the very popular claim that mental processes may influence inanimate matter. This directly runs afoul of the rule that atoms everywhere are identical and have only the ability to interact with known forces of nature. The atoms do not have any mechanism to detect “mental processes”. So “spiritual control” of physical reality cannot be accepted along with science. Once again many prefer to reject science.

Similarly, there is very strong support among the general public for untested “alternative” medicines. There is very strong support even for a medical system which claims that reducing the concentration of the medicine will increase its efficacy. This idea contradicts the whole of chemistry. The supporters sometimes cite the limitations of double blind tests and the ready availability of counter examples to justify their rejection of established science. This support for non-scientific claims which have never been objectively verified emerges from people finding subjective utility in them.

A large fraction of the population does not find any utility in products and procedures developed with the help of fundamental physics, whose usability can be objectively

demonstrated. This is obviously the reverse example of astrology which large numbers approve of, ignoring the complete lack of supporting evidence and the fact that it contradicts fundamental physics.

A significant part of society ignores scientific objections because of their perceived utility of unscientific claims. So one has to distinguish between usability and utility. Usability is objective. Utility is subjective. For example, a knife is usable for cutting. It is objectively true. Usability is available for everyone who has access to a knife. An individual uses the knife to cut because of a perceived utility. The choice may be to cut a throat or a fruit. In both cases there is subjective utility. An individual may praise, ignore, justify or condemn the specific act of cutting. To the individual, the condemnation, approbation or indifference has subjective utility.

Humans value knowledge and technology for its utility, which is inherently subjective. As the examples above show, humans are very reluctant to even acknowledge usability as important. Consequences of this reluctance may be an inconvenience or a tragedy. When a patient suffering from a serious heart problem sees more utility in the prescription of a quack than that of mainstream medical experts, the results could be tragic. If the patient is suffering only from a common cold, there may be only marginal inconvenience. When an individual sinks all his wealth in repeated attempts to develop perpetual motion machines, the result will surely be tragic. If the individual

becomes a flat earth enthusiast, most others would merely be amused.

The reliability of the products and procedures developed without conflicting with fundamental science could be extremely high as in engineering or only slightly higher than random chance as in some medical treatments for diseases. But, humans find subjective utility in a variety of societal actions that are totally unrelated to infallible knowledge and the related objective usability.

Government paying totally or partly for food, shelter and healthcare needs of every individual in the society is not at all related to the usability of farming techniques used to produce food, engineering design and construction of houses or the double blind tests of medicines supplied respectively. Similarly, the usability of a knife is totally unrelated to the utility of producing it to the workmen, the effect of this production on the rest of the society through possible pollution of the environment and the societal consequences of misuse by some individuals. Some individuals may assess a specific societal practice as having very high utility while others may claim that it is useless or even very harmful. The success of modern science has enthused scholars to believe that a “social science” can be found to determine the “usability” of a specific practice. It has also led to demands from groups and individuals in the society for scientific studies so that usability of the practice they prefer can be confirmed.

However, such studies can only reveal “correlations”. No causal relationships have ever been discovered outside physics. Due to the lack of infallible causality, mutually antagonistic conclusions are the norm rather than an exception in “social sciences”. Nevertheless, supporters would claim that their subjective preferences have been “demonstrated to have objective usability”. The choice of accepting any recommendation of “social science” is in reality subjective.

While discussing axiomatic mathematics it was pointed out that the axioms have to be selected very carefully to ensure that there are no contradictions; in the language of mathematicians to avoid inconsistency. This suggests that inconsistency in social science is possibly caused by the basic assumptions chosen in these studies. They may be presented in mathematical language but the assumptions are obviously not viable axioms. If a large section of the population finds utility in a specific societal behaviour, it creates a demand for a “social science” to provide “apparent objective usability”. It is not difficult to achieve this with clever use of words and or complex mathematics.

There is no need for “conscious” intellectual dishonesty. One area of axiomatic mathematics, called deterministic chaos, best highlights the limitations of “social science”. Deterministic chaos emerges when a carefully chosen mathematical step is repeated many times. As a simple example the familiar counting numbers are obtained by adding 1 to the previous number. In this and similar

cases, the result after a large number of steps can be determined without calculating it step by step. If the mathematical step is carefully chosen, usually with one part that makes the result larger than that obtained in the previous step and the other part making it smaller, the result after every step is still completely determined by the mathematical formulae used. But the result after a large number of steps cannot be even approximately known, unless calculated step by step. This perfectly mirrors social science. In every branch of social science, basic premises themselves are mostly inconsistent with each other. And just as the individual steps are perfectly logical, individuals developing social science are often intellectually honest.

Most often, the origin of inconsistency in social science is a conflict between different individuals or groups of individuals. Some individuals would want the society to protect them in holding on to what they have, the rest would want everything to be redistributed equally. Some believe in punishment to be severe in order to deter crime, others prefer to be lenient with criminals and try to reform them. Some justify violence if their religious views are challenged but many others don't. The list is endless. Social science can be developed from each of these principles since all of them are reasonable to begin with. Accepting one and rejecting or minimising the opposite is a subjective preference.

Simple summaries are quite popular and thanks to the flexibility of human language appear at first hearing to

be “wise”. But a critical examination will show that they are in reality useless. They may create an illusion of providing an answer but actually create unresolvable subjective queries. Consider the brief statement that an individual has a liberty to do anything as long as no one else is harmed. Let us ignore complex issues like the individual's responsibility to society and whether actions that “may” lead to future harm should be permitted. Can the individual irrespective of mental and biological age be given this freedom? Is not an age limit that separates children from adults subjective? Can the mental age be objectively defined? Similarly, what constitutes harm to others? Consider a simple popular statement opposed to this pure individualism; “by each according to ability, to each according to necessity”. But who decides what is necessary? How to objectively define individual ability and how far can the society coerce individuals to ensure that they contribute according to the perceived ability?

The lack of causality in social science is inherent in the basic premises themselves. There is no justification for comparing contemporary social science with physics as it was before Newton and claiming that the increasing volume of social science research will sooner or later ensure that future social science will generate objective usability. It is an everyday experience that the use of very complex mathematics does not prevent experts in economics from justifying mutually opposed conclusions as objectively usable.

Everyone justifies this state of affairs by talking about balancing the opposites and integrated approaches. But if the basic concepts themselves are ill defined, balance between them is obviously even more ill defined. All this is simply refusing to acknowledge that social science is scholastic defence of positions chosen a priori for their subjectively assessed utility. Reliance on these experts is however not surprising. As described earlier, experts in astrology boast of many supporters though astrology contradicts infallible science.

The above discussion leads to important conclusions about what everyone needs to know. First and foremost, usability is not utility. Humans are mostly interested in subjective utility, not objective usability. Their selection between alternative usable products and services is always subjective. This is true even when both the choices have been developed accepting the restrictions suggested by fundamental physics. Both a trivial choice between two cars and a choice between chemotherapy and surgery by a cancer patient are ultimately subjective decisions. But for the subjectivity and the possibility of a different conclusion, there would be no reason to opt for a “second opinion” in medical cases. A societal decision, be it choosing between different tax rates or whether to continue capital punishment are completely subjective notwithstanding justifications quoting “social science”. “Expert opinion” is neither impartial or objective and it should not be “blindly” accepted as a commandment irrespective of whether the expert is a scientist or a social scientist.

Secondly, the mysterious relationship between infallible mathematics with observations leads to fundamental physics. The resultant infallibility of fundamental physics leads to the inescapable conclusion that rejecting any claim or observation challenging fundamental physics is always justified. However, as the examples cited above show, humans, in search of subjective utility, quite often refuse to concede this.

Further, only products sanctioned by objective science, those that agree with infallible fundamental physics, can claim objective usability. But even these will have an occasional chance of failure. Successes attributed to non objective “social science” ignore a significantly larger number of failures. The reverse probability is not taken into account and failures far from being specified, may not even be recorded. Humans are very open to claims that contradict infallible knowledge and even those that are not supported by any objective evidence whatsoever. They cite analogies with vaguely defined “philosophy” of fundamental physics or highlight the limitations of objective natural science to bolster their subjective preferences.

Informal advice by family and friends is often claimed to be subjective and modern society encourages searching for hidden motives behind such informal advice. But is the advice of experts who claim the mantle of superior knowledge truly unbiased? Possible ulterior motives of “experts” have been identified since antiquity. In today's

commercial world, the experts are professionals. Giving advice is their livelihood. This is true even when the expert is not directly paid by the recipient of the advice.

They, like everyone else in the society, look for money and professional advancement. They seek the respect, money and applause that success brings. It should be expected that, having invested a lot of time and effort to acquire their “expertise”, they will be quite reluctant to assess their “expertise” objectively and acknowledge its limitations. Obviously these are motives that run counter to the interests of those that seek advice. Deferring to experts is itself a subjective decision.

It was earlier pointed out that uncertainty in the usability of the products of technology is lower than the policies advocated by the supporters of social science. Another important difference between the two has also to be recognised. The individual “chooses” to use a product of technology. Even when the technological product fails to give satisfactory subjective utility, the individual is aware that using it was a personal choice. When an individual submits to societal practices and fails to derive personal benefit the underlying resentment is enhanced. Because objective usability of societal policies is non-existent, the number of strongly disgruntled people in the society will be much larger.

As with advice found in panchatantra, recognising the subjective core of human actions is universally helpful only if “subjectivity” is properly understood. We noticed

that a second opinion in medical matters exposes the subjectivity inherent in medical diagnosis. But we also pointed out the prevalence of quackery. Can the second opinion be from a quack? Is that reasonable, even if one is willing to ignore the superior objective usability of the advice offered by the practitioner of modern medicine? What is the difference between an expert in mainstream medicine and one whom we are dismissing as a quack? Obviously their experience and training. And that is the most important attribute of subjective choice underlying all human actions.

Subjective preferences cannot be logically linked to the experiences by a series of rational steps as in geometry. The individual's subjective choice of today is guided but not logically defined by the accumulated experience of the past. Our subjective choices are indirectly restricted by others, who because of their subjective preferences have encouraged or limited our access to ideas and descriptions of the past.

This influence of others is unavoidable. At the most basic level, human babies need quite a lot of care and attention from mothers and other caregivers over an extended period just to survive. A child cannot even learn to speak a human language in order to ask for food without interacting with the family. Lack of early detection of impaired hearing in infants may lead to permanent deficiencies in adult language skills. Humans seem to have an innate ability to create a language for communication as seen with cryptophasia, a language

made up by twins and triplets who are together from birth. The language is unique to them and unintelligible for everyone else. We recognise those sounds made by a baby as the language of twins only because we are able to notice the response of the other twin. Obviously, even cryptophasia requires a second baby.

In a pre-technological society, individuals learnt all the skills required for living from the family and community. Commercial transactions were rare. Those who taught demanded intellectual obedience and conforming to the norms of the society before they shared the knowledge available with them. In contemporary society, everyone has to make a subjective decision to either freely allow everyone else to benefit from the knowledge in his possession or to demand a financial or other return in exchange. Printing and digital technologies have made vast amounts of knowledge very freely accessible to everyone, empowering impersonal education. But the vastness of free available knowledge makes guidance helpful, at least when one is starting to learn. In addition to vastness, societal norms, patents and copyrights, not to mention the bias of the algorithms used in the popular search engines on the internet restrict the real access of “free” knowledge.

In the pre technological era, humans had no choice but to live in societies for their progeny to have any chance of survival. In today's society, a large variety of goods and services are available, making life very much more comfortable. But a much larger society is needed to

provide these goods and services. This makes living in a large society inevitable. Since individual preferences are subjective, in the large societies, emergence of mutually antagonistic societal preferences should be expected. This would lead to conflicts between individuals. Each individual taking a decision and forcing others to submit to his preferences can only lead to unending conflicts. Consultations and discussions are attractive but what if disagreements persist? An authority to take a final decision and more importantly compel obedience is as necessary in the modern nation state as it was in any small human group or tribe. In any disagreement, the decision of the authority can only support one of the two sides. If the aggrieved party can ignore the decision with impunity, there is no use of the authority and the society will only become dysfunctional. Hence, the ability of the authority to compel obedience is most important. But, irrespective of the origin and emergence of the specific type of governing authority, delegating to it, the power to compel obedience is a double edged sword. It is of course necessary but is often a huge burden.

It is logical for any authority to try to alter the individual's subjective preferences by suitable "education" to ensure obedience. The only other alternative would be reward and punishment which requires more effort. To approve this "education" or condemn it as an "indoctrination" or "brainwashing" will be another subjective preference. An important caveat. We are discussing education only as a means of training individuals to peacefully follow societal

norms. Teaching skills that help in living in a commercial society is also education. This will be considered later.

The powers of the governing authority will have to be exercised by individual humans. They would naturally try to see that education helps them retain the powers they are enjoying in the name of the governing authority and prohibit anything that may subvert the current authority and replace it with another. Inevitable misuse of power by those wielding it is the most important reason why the governing authority was earlier called a double edged sword.

As the above discussion shows, subjective preferences of an individual are always influenced by others due to the necessity to live in a society and the society needs a governing authority for it to be viable and peaceful. It is most important for every individual to accept that all subjective preferences, most particularly one's own, are formed by factors beyond the individual's control. The individual has to weigh carefully the options available when the personal preferences are not aligned with the society. Similarly, society has to consider its response to individual defiance.

A dispassionate look at any military would show that the chance of an authority moulding subjective preferences through education is extremely small. Teaching is a big part of military training but fear of punishments and the allure of attractive rewards are absolutely necessary. All societies dishonour and disgrace soldiers for defying

military authorities. This is also necessary for the military to be functional.

In the contemporary world, education will be much less successful in achieving conformity than even in the case of the military. The stress on discipline is much less. And punishments are much less severe. Once again the contemporary society differs significantly from the pre technological one. Individuals in ancient societies were highly dependent on personal contacts for necessary goods and services. They also had to contribute and this interdependence coerced individuals to conform to all societal norms. This power of a society has mostly disappeared due to the dominance of commerce. The individuals buying all necessary goods and services in impersonal commercial transactions feel empowered to defy societal norms.

The individual's subjective preferences are very likely to change and even reverse at any time. The triggers for such changes are equally subjective. An experience that leaves many people unmoved could cause big changes in others. Both the society and the governing authority resent individuals who do not conform to the prescribed societal norms. Historically, most societies have termed such differences apostasy or blasphemy. Most societies prescribed painful punishments for those "crimes".

Whether a given individual opts to become an apostate or a blasphemer depends very much on the technology available. Today, individuals buy as required through

impersonal commercial transactions. Similarly, advances from printing to the internet have helped individuals to acquire knowledge independent of society. Both have hampered the authority's ability to achieve conformity. Simultaneously, these days, societies are very reluctant to use severe physical punishments. So contemporary societies turn to economic rewards and punishments to encourage most individuals to conform to current societal norms.

The power to impose punishments may be vested in the family, religious groups, police, judges or administrators. The prescribed punishments vary widely and will change with time. But it can be safely said that punishments for “holding or advocating” an opinion adverse to societal norms are less stringent in a democracy as compared to a dictatorship which is the only other alternative. In the past, divinely ordained kings, military officers, priests or the leaders of the communist party have had dictatorial powers. Some dictators employ severe punishments, a few may be more benign. A stronger commitment to theology or communist ideology makes authority more indifferent to suffering of individuals subjected to severe punishment.

In the present discussion, market transactions are also viewed as one of the rewards available to the authority. There are several arguments in support of this view. To begin with, the rules governing market transactions in a society are obviously the subjective preferences of the governing authority irrespective of whether the authority

is a dictatorship or democratically elected by the society. These rules determine incentives for the individual to obey or break the rules. Differences in the interpretation of rules leads to conflicts between individuals as well as between individuals and the authority. As an example, consider those who flaunt their luxuries and comforts. They attract thieves. Luxuries may motivate individuals to make more effort to acquire luxuries for themselves or initiate litigation or petition the authority to change the rules in order to, if possible, prevent or at least restrict the availability of such luxuries. The punishment for theft will be determined by which of these ideas dominate.

More importantly, individuals will always try to maximize “immediate” personal benefit while participating in any commercial transaction. So, a seller would petition the authority to lower taxes and if possible persuade the government to enforce a minimum price. A buyer on the other hand wants the authority to compel the seller to accept a lower price. Both will claim that the public at large will be benefited by government intervention. Both will seek the support of “social science” and highlight suitable examples to create sympathy for their position.

Those directly wielding power and their supporters will always try to use government powers to acquire illegal wealth or to escape punishment for their illegal acts. Sometimes they will also seek to get the laws modified in their favour. Groups within a democracy will also seek changes in laws which would potentially benefit them. Politicians seeking power to rule will very naturally offer

freebies to garner votes in a democracy. Even when societies claim to support “free markets” and allow some partial leeway to the buyers and sellers to decide prices, they often dictate a specific price for some goods. The best example is a doctor in a society which mandates universal free healthcare, who has to accept the price decided by the government.

Such measures to modify free market exchange are popular because a large fraction of the society views unrestricted markets as unjust. They believe that a “just price” exists. This in turn is a subjective preference to believe in the old adage “every workman must be worthy of his hire”. But real world experience shows that prices in commercial transactions depend too much on supply and demand. Wages offered to workers depend much more on demand for their skills rather than on the skills themselves, acquired through education or training. So universal acquisition of skills lowers the wages.

A vast majority of humans strongly resent this reality and stick to various subjective preferences which they call justice. The proponents of justice may be accused of trying to cover up the financial benefits accruing to them. Their “leaders” can be similarly dismissed with a statement that the real issue is not justice but the desire for political power. But the accusation is just as much a subjective preference as the concept of justice itself. Here one comes close to the heart of the solipsistic core of subjectivity which will be discussed later.

Just as a commercial transaction has been discussed as a reward, postponing immediate benefits is viewed as a punishment in this analysis. Three reasons can be cited in support of an authority punishing an individual. First to “reform” by dissuading the individual from repeating the act. Second to dissuade others from following the same path seeing the individual as an “example” that could be followed. Finally to “prevent” any unreformed individuals from repeatedly harming the society, All the three are hopes. Success is not guaranteed. Thus, discipline and punishment are similar. Both involve restricting freedom of current action hoping for long term benefits. Discipline is restricting freedom of current action with a “hope” of enjoying even more in the future.

It is postponement with only a “hope”, not a certainty, of getting something better at a later date. It is rare enough to find individuals to be disciplined for future personal benefit. Individuals being motivated to postpone current enjoyment to benefit others as much or more than themselves will obviously be much more difficult to find. It is not farfetched to argue that fame and adoration are important motivations for at least some among the limited number of avowedly altruistic individuals and a heaven promised by religion for many others.

An old tale in India (not in the panchatantra) describes a king asking each of the citizens to pour a small pot of milk into a common container for a religious ceremony. He found that only water had been collected. Each citizen had argued that his own act of adding water

wouldn't matter if everyone else had contributed milk. Ultimately no one contributed milk.

Everyone prefers others to be disciplined and postpone their immediate benefits. So societal discipline cannot be achieved through promises of "possible" long term benefits for everyone. Societal discipline will need fear of punishment. This is true whether the societal policy advocated is a free market, government ownership of all means of production or anything else. Clearly, if every citizen has a say in electing a governing authority, as in a democracy, there will be unrelenting pressure to tinker with the market and increase immediate benefits. There is however no similar pressure to encourage postponing immediate benefits, that is to say, to be disciplined. The various attempts by the society to prevent prices from changing in accordance with supply and demand were discussed earlier. There is no time lag between initiation of these actions by the society and the targeted group receiving the benefit. In practice, not everyone even in the target group may be benefited. However, the beneficiaries are not foregoing any current consumption.

In dictatorships and oligarchies only a small segment of citizens decide matters. The authority can easily ignore both the individual's aversion to discipline and desire for immediate benefits. Theocracies as well as communist dictatorships are convinced of being in possession of ultimate truth. Neither of them will tolerate apostates or blasphemers and both will have no inhibitions in using severest punishments to achieve discipline. Most other

dictatorships are primarily concerned only with retaining power. They use extremely severe punishments to cow the public to obedience. Patriotism or ethnic pride may appear to help impose discipline but in reality will rarely work and when it works, does so for a short time, unless strong punishment is employed.

The above discussion describes the unvarnished reality and exposes the universal human traits. Without fear of punishment or lure of benefits, only a very small fraction of humans will prefer service to others before self and a much larger fraction will grab the smallest benefit to the self without ignoring the consequences at the collective. If accused of selfishness or shortsightedness, everyone will find excuses for themselves and identify others to blame.

Even those who decry individualism and seek to make human society more social will concede that individual awareness is unique. A section of the population is worried that some in the society are zombies, soulless creatures. A famous scientist proposed that a computer that can sustain a conversation with a human may be considered to be sentient. We reverse these ideas and ask whether we can “know” that the self awareness of any other human is identical to our own. The answer is that we cannot. That any one else is self aware cannot be logically proved because self awareness itself is not amenable to any rational enquiry. Self awareness has to exist before individuals can develop rational arguments.

We can argue that accepting that all humans are very much like one's own self is moral or logical but that is not the same as "being aware" that they are so. To treat other humans as sentient is a subjective preference and there can be counter arguments and exceptions. What about a person in a coma, or a baby or even a foetus or a whale? Similarly, how does one know the difference between a dream and reality? Ancient Hindus argued that one cannot prove that this is real and that is only a dream. Similarly, drug induced hallucinations, spiritual claims of mystic experience and daydreaming cannot be logically distinguished? Rational argument will only lead to solipsism, the ancient view that the self is all one can know to exist.

This rather arcane philosophy is essential if one wants to honestly discuss theology but that is not relevant to the current discussion of subjective preferences related to this world. However, solipsism provides a very important insight relevant to the present discussion, that one can independently confirm others actions by observing but their motive for the act cannot be verified.

Psychiatrists can offer expert opinions but psychology is not causal. All correlations in psychological studies are subject to all the limitations discussed above. In view of this, ignoring any justification or motivation that may be offered by anyone including expert psychologists for any observed act is filly justified. To help individuals find the

optimum paths for achieving their goals, what others are likely to do is important. Why they do so is irrelevant.

Every human being will inevitably be part of a society. The society will need to have a governing authority that determines the societal norms and the punishments for violators. The authority may enforce the norms strongly or weakly; reliably or unreliably. An individual's personal preferences may differ from the societal norms strongly or weakly. When the differences between the personal subjective preferences and the societal norms are very small the individual will co-operate cheerfully.

However, if the differences are significant, the individual has the following alternatives; sullen obedience, covert violation, open defiance and ultimately relocating to a new place where the individual preferences are better aligned with the societal norms. The individual balances the subjective utility of an act against the likelihood and severity of the punishment that will be imposed by the society. When the utility is small and or the punishment is sure and considered severe, the individual will obey, sullenly. However, punishment that deters one individual may not deter another. For example, even the fear of capital punishment does not completely stop murders in society.

One can object that the very elaborate discussion of infallibility and subjective utility is hardly necessary for such a very commonplace conclusion. Further, many would object that the summary is morally wrong and

mere nihilistic pessimism. The present analysis clearly argues that morality is relative. This may be repugnant not only to the religious who strongly believe in divinely sanctioned moral codes, but even to a large fraction of atheists.

The remaining part of this analysis will show that this is not true and that the narrative has both coherence and utility. As with the panchatantra, the current analysis is unapologetically amoral. As in the panchatantra, specific do's and don'ts for success are not provided. The utility of the analysis as a universal guide to human success will become apparent when all human activity is seen to be of two types. In the first, the individual doesn't expect or desire to change other's views about societal norms. In the second group, the individual expects to persuade other individuals to support and practice societal norms of his preference. This division is most important but has possibly been never identified, let alone emphasized.

Let us consider the first group which consists of acts undertaken by the individual for personal benefit. This includes acts of personal charity motivated by religion or atheistic compassion. The present analysis offers the following insights to help choose from among cheerful or sullen cooperation, covert defiance, open rebellion and relocation.

The first lesson is to reject the guilt conscience being hoisted on individuals in the name of "responsibility" towards the society. In contemporary society this has

been extended to atoning for the crimes committed by one's ancestors and even actions that are not even illegal under the present laws. Individuals may even be pilloried for contemplating relocation to a more suitable location or country. All of these are nothing but attempts by a section of the society to enforce their preferences even when they are unable to convert them into legally enforceable laws, enforced by the governing authority. The court, a wise man once said, enforces law and not necessarily justice. Similarly, an individual, to succeed, must consider whether to follow the laws of the society but shouldn't hesitate to ignore the other arguments.

Individuals can of course choose to be altruistic or reject relocating to a more comfortable environment. But even they will be benefitted by recognizing that the advice or education is in reality support for subjective preferences of those wielding or seeking power. It is merely another subjective societal norm. Decrying an individual who is weighing the benefits and consequences of obedience to societal norms as selfishness is an attempt to hide this reality. Widespread violation of the norms indicates that the societal norms are incompatible with individual subjective preferences of a large fraction of the society. The lamentation also shows that the society is unable to enforce its dictates.

While conforming to societal norms is undoubtedly only an option, violating societal norms for very minute or non-existent benefits could negatively impact the overall individual discipline. As mentioned earlier, discipline is

trading current discomfort for future benefits. Obeying some of the societal norms even if they cause personal discomfort helps an individual's self discipline, just as a workout helps an athlete. Discipline is a comprehensive attribute of a person. Religions that seek to discipline individuals to seek benefits beyond the physical world nonetheless advocate discipline in all aspects of living for this reason.

An individual completely indifferent to all societal norms is a libertine, concerned with immediate comforts and is unlikely to have the discipline required to be successful. Possible loss of self-discipline should be an important consideration to the individual while evaluating possible responses to societal norms that are antagonistic to personal preferences. Societal norms will slowly change over time. Waiting for these changes will be detrimental to achieving personal goals. So, one has to plan and act within the constraints of the present societal norms.

It was pointed out that many in society find subjective utility for things that have no objective utility whatsoever. Would holding such subjective opinions be a hindrance for achieving personal goals? As mentioned above, the consequences of having preferences without objective usability could be both tragic or trivial. In view of this, to avoid tragic consequences, the individual, when seeing subjective utility in a particular case, must be conscious of the strength of infallible knowledge and limits imposed by objective usability on his choice.

Religion is a good example. It is the source of subjective preferences for many. No one has ever demonstrated any objective usability for any of the religious practices or commandments. If one ignores this lack of objective usability and claims eternal objective validity for every religious saying, it becomes a liability in achieving goals. On the other hand the discipline of religious observance without a dogmatic insistence of it being objective truth could be helpful and certainly not a hindrance. Even an astrologer would be better off accepting the absence of objective validity for astrology and concentrate on the current customer rather than try to establish astrology as a science and court certain failures. Obviously, this is walking on a knife edge but that is the best option in the quest for success.

Similarly, frustrations in the contemporary world are the consequence of not accepting the extremely limited objective usability of the prescriptions of social science and ignoring the failures of societal norms based on it to deliver success. Recognising this reality and evaluating the unrealistic expectations of others in society would help individuals to plan for their personal success. This is the second take away from the current analysis.

Finally, an individual must own failures and not blame other individuals or the society or even fate or random chance. Self reliance does not mean not accepting help when offered by family, friends or the society, let alone not using the market. Self reliance does however mean being aware that they could be withdrawn anytime. It

does mean not wailing that the societal norms are to blame. Being self reliant is necessary for success in realising one's goals. Being aware of dependence on external assistance and striving to avoid it is an essential part of self reliance. A failure to accept this will trap individuals into being addicted to assistance and that will not deliver any meaningful or challenging goals.

Now turn to the second type of activity, the attempt to persuade others to alter societal norms or resist such changes. Any societal norm will benefit only one part of the society, while some are unaffected and some others are adversely affected. This is absolutely true in every case. As can be expected, those adversely affected will try and minimise these negative consequences. Those fearing adverse consequences of a proposed change in norm will try to prevent its acceptance by the society. How such individuals are likely to act in their personal self interest and the options available to society have been discussed earlier. At this point, we seek to identify how the present analysis helps those seeking to enforce or change societal norms.

Understanding the limited objective usability of societal norms is extremely more important for those seeking to persuade others to change than for those seeking to benefit themselves. It must make them realize that large conspiracies are not needed to explain the failure of societal norms to deliver anticipated benefits. These advocates of societal policies shouldn't fool themselves

that coercion is not necessary. They must also accept that others in the society are aware of this reality.

Individuals seeking to change societal norms or their enforcement must also recognise that though education appears easy, it will not ensure individual conformity to societal norms unless questioning orthodoxy is severely punished. This in turn would require severe restriction of individual speech.

Whether the governing authority is trying to persuade individuals to totally commit to the benefit of the society or to strongly protect private property, it needs to coerce individuals often severely. So the reformers must not be squeamish about government coercion. In fact they can never begin to try out their ideas without it. Coercion will of course be needed to execute their policies but it will not guarantee success in implementing or satisfactory results. Success will unfortunately depend on objective usability. This is the first lesson.

Just as individuals violate societal norms for very minute benefits and imperil their self discipline, the reformers try to correct microscopic “injustices”. They consider only the desirability of the programs and not the coercion needed to ensure that everyone obeys these laws. As mentioned earlier, unenforced norms are always the worst choice for any society. They encourage violation of all norms. When most violators are not punished, the few being prosecuted are obvious victims of personal vendettas.

The recent efforts to achieve social justice are a good example of the efforts by reformers to address even small injustices. Every such measure identifies groups that deserve special treatment just because they or their ancestors are victims of injustice in the past. Demands to “prove” that any contemporary law has been violated are dismissed and those making such demands are all labelled corroborators.

Among those not belonging to these groups, only a few accept the burden of collective guilt. A large fraction of those that do so are not at all personally affected. Those wealthy or super intelligent can afford guilt as a cloak of honor. The rest may form groups to highlight their own grievances and get benefits through government action. They could alternatively use non governmental routes to avoid these restrictions. Ultimately they try to migrate. It is certain that the reformers will not be satisfied with the results of the consequences. Once again the reformers are limited both by the coercion required to achieve the equity they desire and the objective usability that limits the equity achieved even with severe coercion.

The reformers may find subjective utility in enforcing their ideology despite the lack of objective usability. These are the ones to condone, justify or participate in violently attacking the existing governing authority. They however, should remember that the powers are actually implemented by government officials. Some individuals may pretend to accept the ideology to eventually grab

dictatorial powers. Similarly, the reformers are better off accepting both the limited objective usability and the need for coercion. Coercion required depends on both the specific policies and the number of people adversely affected. For example, less coercion will be required to implement universal health care in the society than to equitably distribute housing. As is trivially obvious, those in the first group, acting for personal benefit should not consider violence as an option.

Any society is the result of individuals making choices which hopefully will benefit them. They are more likely to realise those benefits when they recognise the importance of objective usability even if their subjective preferences based on religion or collectivist ideologies have no objective usability. Success comes to those who accept that humans will not voluntarily cooperate for collective benefit. The ant colonies are a great ideal for many. But, it is worth remembering that ant colonies have warriors, farmers, scavengers and health workers but operate without a police force to maintain internal discipline.

